CLAIMS

What is claimed is:

1. A computer-implemented method for pricing a financial derivative of a non-marketed variable x_e, the method comprising:

a) determining a market representative x_m useful in determining a value of the financial derivative;

b) retrieving information associated with the non-marketed variable x_e and the market representative x_m;

c) calculating a solution to an equation involving a price of the financial derivative $V(x_e, t)$ defined as a function of x_e and time t, wherein the equation comprises a coefficient involving the information associated with x_e and x_m;

and

d) generating an output including the calculated price of the financial derivative.

2. The method of claim 1 wherein the information associated with x_e and x_m comprises a drift rate of the non-marketed variable x_e, and a drift rate of the market representative x_m.

3. The method of claim 1 wherein the information associated with x_e and x_m comprises variances of the non-marketed variable x_e and the market representative x_m, and a covariance between the non-marketed variable x_e and the market representative x_m.

4. The method of claim 1 wherein the coefficient involving the information associated

with x_e and x_m has the form $\mu_e - \beta_{em}(\mu_m - r)$, where μ_e is a drift rate of the non-marketed variable x_e, μ_m is a drift rate of the market representative x_m, r is an interest rate, and β_{em} is a factor derived from a variance of the market representative x_m and a covariance between the non-marketed variable x_e and the market representative x_m.

5. The method of claim 1 wherein the equation is a modified Black-Scholes equation.

6. The method of claim 5 wherein the modified Black-Scholes equation is obtained from a standard Black-Scholes equation by replacing, in a term involving a first-order partial derivative of $V(x_e, t)$ with respect to x_e, a coefficient r, representing an interest rate, by a coefficient involving the information associated with x_e and x_m.

7. The method of claim 1 wherein the equation is a discrete-time equation involving $V(x_e, t)$ defined as a function of x_e and discrete time points $t = k$.

8. The method of claim 1 wherein the market representative x_m comprises a marketed asset or combination of such assets that is approximately most correlated with the non-marketed variable x_e.

9. The method of claim 1 wherein the market representative x_m comprises a combination of multiple marketed assets associated with market sectors most closely associated with the non-marketed variable x_e.

10. The method of claim 1 wherein the market representative x_m comprises a marketed asset or combination of such assets that is approximately equal to an overall market portfolio.

11. The method of claim 1 further comprising calculating an optimal hedge.

12. The method of claim 1 further comprising calculating a minimum variance of the error between an optimal hedge and the calculated price of the financial derivative.

13. The method of claim 1 wherein the equation represents a risk-neutral discounted expected value of cash flows of the financial derivative.

14. The method of claim 13 wherein a cash flow of the financial derivative is path-dependent.

15. The method of claim 1 applied to derivatives of a set of non-marketed variables wherein the market representative x_m comprises a combination of multiple marketed assets, each most-correlated with a different non-marketed variable in the set of non-marketed variables.

16. The method of claim 1 wherein the calculated price of the financial derivative includes cash flows at an intermediate time and a terminal time.

17. The method of claim 1 wherein drift rates, an interest rate, variances, and covariances of x_e and x_m either vary with time or are governed by stochastic processes.

18. The method of claim 1 wherein the cash flow depends on marketed variables as well as non-marketed variables.

19. The method of claim 1 wherein the equation involves additional non-marketed vari-

ables.

20. The method of claim 1 wherein the market representative is derived from a combination of multiple marketed variables, and wherein x_e and the multiple marketed variables are governed by either geometric Brownian motion or alternative processes.

21. A computer-implemented method of pricing a financial derivative of a non-marketed finite-state variable B, the method comprising:

a) determining a market representative A associated with the non-marketed finite-state variable B;

b) calculating risk-neutral probabilities for the non-marketed finite-state variable B using a binomial lattice model associated with the non-marketed finite-state variable B and the market representative A;

c) calculating values of a price function V defined on the lattice corresponding to the variable B;

and

d) generating from the calculated values of the price function V an output including a calculated price of the financial derivative.

22. The method of claim 21 wherein the market representative A is determined to be approximately equal to at least one of a Markowitz portfolio, a market portfolio, and a market asset most correlated to the non-marketed finite-state variable B.

23. The method of claim 21 further comprising calculating an optimal hedge.

24. The method of claim 21 further comprising calculating a minimum variance of the error between an optimal hedge and the calculated price of the financial derivative.

25. The method of claim 21 wherein a cash flow of the financial derivative is path-dependent.

26. The method of claim 21 wherein the binomial lattice model comprises time-dependent lattice parameters of the variables A and B.